BACKGROUND OF THE INVENTION

1. Field of the Invention:

The invention relates to a new and improved powered rotating turntable and chuck, and, more specifically, with a pneumatically-adjusted, self-centering, self-adjusting chuck for holding auto wheels and the like for polishing.

2. Description of the Prior Art:

Various devices and mechanical arrangements have been used in the prior art to quickly grip and hold metal parts for polishing.

Professional polishers of custom wheels take great pride in their work and enjoy performing specialized buffing of rims. Unfortunately, this type of work can become time-consuming and difficult if a number of different size wheels need to be polished. The individual may encounter custom wheels of 13, 14, 15, 16, 17 and up to 21 inches in diameter. This means that the jig must be continually changed to accommodate the particular size of wheel to be polished. Making these constant changes can be rather aggravating and can even make the task less enjoyable for the worker.

In an effort to improve the wheels of vehicles get polished, the applicant herein has invented a universal polishing chuck. This universal polish chuck would be all that the person needs to polish specialized wheels of all shapes and sizes. The air cylinder would adjust the

three pulling brackets around the outside of the 1/2 inch steel plate to hold the wheel by its lip on the top side of the table. Once the wheel is properly positioned and gripped, it would be ready for polishing. Subsequent wheels to be polished may require simple adjustment of the pulling brackets to accommodate the particular diameter.

The universal polishing chuck would be ideal for businesses that engage in extensive wheel polishing and need a means of converting between wheel sizes without delays. Instead of continually stopping the operation for changing a jig, the same chuck could be used for each wheel. This would speed up the wheel polishing process for the worker and make the task more enjoyable. Increased productivity would also result with the individual able to polish a greater number of specialized wheels in the same period of time. This could increase profits for companies and improve job satisfaction.

The strong steel construction of the universal polishing chuck could also help ensure a long, reliable life for the business. The pneumatic cylinder used to operate the three pulling brackets could be easily operated with a compressed air supply readily available within the shop. The simplicity of the pulling bracket design would ensure the device is simple for the user to operate, allowing changes in wheels to be completed in a fraction of the time it would normally take.

Of course, end users of the specialized wheels could marvel at the deep. gleaming polished finish of the metal. This could help attract added attention to the wheels when applied and make the motorist proud to be seen driving the vehicle. This could leave both the customer and the detailer with a positive feeling. The professional results rendered with the use of the universal

polishing chuck could even result in word-of-mouth advertising that increases business for a detailing shop.

In regard to the universal polishing chuck, it is interesting to note trends relating to the specialty automotive market. According to the latest research by the Speciality Equipment Market Association (SEMA), Diamond Bar, California, the performance market amounts to $10 billion at retail. SEMA splits the market into three segments: Appearance (basically all custom accessories), Handling (basically tires, wheels, and ride control), and Performance (all internal and external engine parts).

Of the three, automotive appearance products are the fastest growing market segment. They are lead by light truck accessories, growing at 15 percent annually. This represents 3.27 billion of the automotive specialty market. Performance parts represent $3.58 billion in retail sales, almost $500 million of which involves racing parts. Between government regulations and technology, however, the overall growth of performance parts is barely keeping pace with inflation. Handling products represented $3.15 billion of the total.

U.S. Patent No. 4,034,786 (Feldmann et al.) The patent to **Feldmann et al.** discloses a wheel chuck in which three wheel engaging chucks are disposed on the ends of three lever arms.

U.S. Patent No. 4,517,773 (Heiden et al.) The patent to Heiden et al. discloses a grinding wheel having a plurality of flaplike members extending therefrom.

U.S. Patent No. 5,172,617 (Rohm) The patent to Rohm discloses a lathe chuck.

SUMMARY OF THE INVENTION AND OBJECTS:

Fundamentally, the invention disclosed herein is basically described as a new and improved powered rotating turntable with a self-adjusting chuck for gripping and holding auto wheels for polishing. The chuck is pneumatically controlled for gripping specialty wheel rims of motor vehicles to facilitate the polishing thereof. The chuck is self-adjusting and is able to handle any diameter of wheel. With its self-adjusting, self-centering capability, the need to set up a new jig each time that a group of rims having a diameter or style different than the last series of wheel rims that were polished is eliminated thereby greatly improving the efficiency of the entire wheel polishing operation both in terms of time and cost of operation. It has a mounting shaft that is standard for semi-automatic wheel polishing machines. Once the wheel has been polished, the air would be vented and the pneumatically-operated brackets would return to their original unactuated position for receiving the next sized wheel to be polished. Basically, this invention is readily adapted to polishing all of the currently standard-sized wheels and rims, including, but not limited solely thereto, 13, 14, 15, 16, and 17 inches in diameter wheels without stopping to change jigs as normally would be the case. Obviously, this pneumatically-operable chuck could be used by any business that would be involved in the polishing of specialty metal wheels.

It is a general object of the instant invention disclosed herein to provide a powered turntable incorporating a pneumatically-operable chuck for gripping and holding metal rims or wheels to polish such rims or wheels.

Another primary and important object of the invention disclosed herein is to provide a powered turntable with a pneumatically-operated chuck of the type which is to be operated with greater facility and reliably than previous machines of this type.

It is yet a still further and important object of the present invention to provide an improved construction and arrangement of parts which is durable, efficient and readily manufactured.

Another further important and primary object of the invention is to provide a powered turntable with a pneumatically-powered, self-adjusting chuck which automatically adapts to the particular size wheel so the operator never has to change jigs, thereby saving time, money and effort, particularly when polishing a number of wheels.

Other objects and advantages of the invention will become apparent to those acquainted with equipment of this type upon reading the following specification and inspecting the accompanying drawings here set forth.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application will appear in the appended claims.

For a more complete understanding of the nature and advantages of this invention reference should be had to the following detailed description, which describes the best illustrative embodiments of this invention at present known to the applicant, taken in connection with the accompanying drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS:

FIG. 1 is a perspective view of the invention described and disclosed herein shown gripping and holding a wheel rim for polishing.

FIG. 2 top view of the present invention illustrating the three (3) gripping and retention chuck fingers for retaining the rim of a vehicle wheel.

FIG. 3 is a bottom slightly perspective view of the present invention illustrating the pneumatically powered mechanism for concurrently actuating each of the three (3) gripping and retention chuck fingers for retaining the rim of a vehicle wheel.

FIG. 4 is a side cross-sectional view of the driving shaft, bearing and disk assembly, and the central portion of the turn table.

FIG. 5 is a top view of the control disk of the present invention.

FIG. 6 is an enlarged, vertical cross-sectional view of one of the three (3) jaws of the instant invention described herein forming the chuck for holding the workpiece, such as an automobile wheel, for polishing.

DESCRIPTION OF ONE PREFERRED EMBODIMENT OF THE INVENTION:

With continuing reference now to all of the Drawings herein, and with special emphasis now on **Fig. 1**, there is shown and described a new and improved automatic and self-adjusting universal chuck for holding and auto wheels, generally indicated at 10. The new and improved automatic and self-adjusting universal polishing chuck and turntable assembly 10 is typically used for positioning and retaining an auto wheel 12, generally indicated at 10, and includes a pneumatically-adjusted metal chuck generally indicated at 11 as shown in **Fig. 2**. It is used for gripping and rotating wheel rims of motor vehicles in order to polish the wheel rims. The chuck 11 is self-adjusting and is able to handle any diameter of wheel. With the self-adjusting capability, the need to set up a new jig each time that a series of rims having a different diameter or style than the last series of wheel rims polished is eliminated. As a result, the efficiency of the entire wheel polishing operation is greatly improved in terms of the amount of time needed to polish the wheel rim and in a reduction in the cost of labor to perform the polishing operation.

One of the preferred embodiments of the instant invention is to provide a new and unique combination powered turntable 13 with a self-adjusting, self-centering chuck 11 for holding and positioning an auto wheel 12, or the like, including a powered turntable 13 having at least three radially-arranged, equidistantly-disposed slots 14, 15, and 16 therein, a hollow drive shaft 17 centrally mounted to the turntable 13 for driving the turntable 13, three jaws 18, 19, and 20 slideably mounted in the slots 14, 16, and 15 in the turntable 13 for gripping and holding the auto wheel 12 to be polished, a bearing 21 having an inner race 22 and an outer race 23 with bearings 24 housed therebetween, the inner race 22 being mounted on the drive shaft means 17, an annular disk 25 having a centrally located receptacle 26 for receiving the outer race 23 of the bearing 21 therein, the receptacle 26 adapted to

operably receive and mount the outer race 23 of the bearing means 21 therein, the disk means 25 having at least three equidistant threaded receptacles 27, 28 and 29 for receiving threaded fasteners 30, 31 and 32 therein, whereby the disk means 25 is rotatably movable independently of the rotating movement of the drive shaft means 17, at least three longitudinal position control arms 33, 34, and 35 for positioning the jaws 18, 19 and 20 respectively in the slots 14, 16, and 15 in the turntable 13, each control arm having a pair of oppositely disposed ends with an aperture in each end thereof. Apertures 36, 37 are in the opposite ends of the longitudinal control arm 33. Control arm 34 has a pair of oppositely disposed apertures 38, 39, and control arm 35 has a pair of apertures 40, 41. Pairs of threaded fasteners 42, 43, and 44, 45, and 46, 47 are used to pivotally secure each of the control arms 33, 34 and 35, respectively, to the sliding guide blocks 48, 49, 50 which are, in turn, respectively, secured to the jaws 19, 18 and 20 and the disk 25.

The pairs of threaded fasteners 42, 43, and 44, 45, and 46, 47 are respectively indirectly secured to the jaws 19, 18 and 20, respectively, via sliding guide blocks 48, 49, and 50, respectively disposed in the slots 16, 14 and 15 directly beneath the respective jaws 19, 18 and 20. The sliding guide blocks 48, 49, and 50, respectively, are secured directly to the jaws 19, 18, and 20 via a pair of threaded bolts one example of which is shown in **Fig. 6.** One of the three jaws, jaw 18 is shown in cross-section in **Fig. 6** and is disposed over slot 14 in the turntable 13. The sliding guide block 49 is secured to the bottom of the jaw 18 via a pair of threaded bolts 51 and 52. The other jaws 19 and 20 are similarly arranged and connected with a pair of threaded bolts to the sliding guide blocks 48 and 50, respectively, and disposed in the corresponding slots 16 and 15 as is jaw 18 in **Fig 6.** In this way, each of the pairs of apertures in the ends of control arms, 33, 34 and 35 are pivotally secured between the disk 25 and the sliding guide blocks 48, 49 and 50 thereby controlling the position of the jaws 18, 19

and 20 within the slots 14, 16, 15 via the pivotal connection, respectively, to the guide blocks 49, 48, 50.

To prevent lateral movement of the inner race 22 of the bearing 21 away from the nearest end 54 of the drive shaft 17, a stop means in the form of a undercut portion of the drive shaft 17 forming a shoulder 53 is provided as shown in **Fig. 4**. Correspondingly, the outer race 23 is seated with a receptacle 26 in the disk 25 which has a undercut shoulder 55 therein as illustrated in **Fig. 4**. In this fashion, the entire bearing 21 is restricted from lateral movement on the drive shaft 17.

It should be noted, at this time, that the rotary movement of the turntable 13 is independent of the rotary movement of the disk 25. The reason for this is self-evident.

With special emphasis now on **Fig. 3**, a pneumatically-operated piston-driven shaft 56, also referred to as a pneumatic actuator, the shaft 56 being longitudinally moveable within a housing 57, is used to operate a positioning and locking arm 58 for the disk 25. One end 59 of the disk positioning and locking arm 58 is preferably securely mounted to the disk 25 by welding the one end 59 of the arm 58 directly to the disk 25. The opposite end of the arm 58 has an aperture which is pivotally secured to a clevis 60 mounted on the end of the shaft 56 via a fastener, such as a bolt and nut. The other end of the housing 57 is pivotally mounted to the bottom of the turntable 13 via a clevis 61 through which a bolt 63 is mated to a threaded receptacle 62 as shown in **Fig. 1** in the turntable 13.

A source of compressed air is delivered to the pneumatic actuator composed of a shaft 56 mounted within a housing 57 via a swivel valve 64 connected hollow portion 66 of the drive shaft 17 as shown in **Fig. 4**, to the end 67 of the drive shaft 17. The swivel valve 64 remains in a

relatively fixed position while the drive shaft 17 is rotationally driven to drive the turntable 13. The swivel valve 64 is connected to the source of compressed air via tubing 65 as illustrated in **Fig. 3.** In turn, as shown in **Fig. 4**, the hollow portion 66 of the drive shaft 17 is connected to a tubing connector 68 connected to a second tubing 70 via a cross-bored passageway 69 in the drive shaft 17 which intersects the hollow portion 66 of the drive shaft 17. The other end of the second tubing 70 is connected via a tubing connector 71 which is mounted to the housing 57 of the pneumatic actuator. The tubing connector 71 is in pneumatic connection with the inside of the housing 57 of the pneumatic actuator.

In normal operation, without the application of the source of compressed air the housing 57 of the pneumatic actuator, the shaft 56 is, "at rest", and is fully extended from the housing 57. Such full extension of the shaft 56 is ensured by the tension bias produced by the spring 72 which is fixedly anchored at one end to the table 13 via an aperture 73 in the table 13 as shown in **Figs. 2** and **3**. The opposite end of the spring 72 is connected to the positioning and locking arm 58 via a hook section 74 formed in the arm 58. The spring 72 is adjusted to exert a continuous tension biasing force between the table 13 and the positioning and locking arm 58 so that after the compressed air is relieved from the housing 57 of the pneumatic actuator the force exerted thereon by the shaft 56 when the compressed air is delivered to the housing 57 of the pneumatic actuator ceases, the positioning and locking arm 58 is moved by the tension forces exerted by the spring 72 to the jaws 18, 19 and 20 unlocked position within the slots 14, 16 and 15.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention, which, as a matter of language, might be said to fall